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sodium orthoborate, and also by treating the latter salt with hydrogen peroxid. The sodium salt, $\text{NaBO}_3 \cdot 4\text{H}_2\text{O}$, and the ammonium salt, $\text{NH}_4\text{BO}_3 \cdot \text{H}_2\text{O}$ were formed and while powerful oxidizing agents are quite stable. These are the only compounds of quintivalent boron known, though from the second method of formation the possibility of their constitution being $\text{NH}_4\text{BO}_2 \cdot \text{H}_2\text{O}_2$, and $\text{NaBO}_2 \cdot \text{H}_2\text{O}_2 \cdot 3\text{H}_2\text{O}$ would seem not to be excluded.

MUCH discussion has been occasioned by the announcement of the discovery of new gases in the atmosphere. Professor Berthelot calls attention in the *Comptes Rendus* to the fact that the green line of krypton almost exactly coincides with the green line of the aurora spectrum, and suggests that the element should, therefore, be called eosium. Dr. Arthur Schuster in *Nature* shows the spectrum of metargon to resemble closely that of carbon plus that of cyanogen. In replying, Professor Ramsay recognizes the great similarity, but produces evidence which seems to render it very improbable that any form of carbon could be present, as the metargon spectrum remains the same in spite of every effort to remove any possible carbon present either as an element or a compound.

THE element calcium has generally been described in text-books as a yellow metal. This color is evidently due to impurities, as M. Moissan has recently obtained pure calcium, in the form of brilliant white hexagonal crystals. The crystals were obtained by dissolving the metal in liquid sodium at a low red heat and removing the sodium by means of the cautious use of absolute alcohol. Calcium can also be obtained by the electrolysis of fused calcium iodid. Each of these methods yields a metal over ninety-nine per cent. pure.

IN the *Comptes Rendus* Moissan also shows that the metal calcium burns strongly in

hydrogen forming a hydrid CaH_2 , which is transparent, crystalline and stable. It is decomposed by water with great violence, hydrogen being evolved. It is not, like the corresponding hydrid of lithium, decomposed by being heated in nitrogen. In order to distil pure lithium the metal must be kept in an indifferent gas, and for this purpose hydrogen or nitrogen will not serve, as lithium combines directly with both. The only gases which would be really indifferent would be argon and helium.

ACCORDING to *Nature* the latest statistics show a total of 6,144 chemical works in Germany, employing over 125,000 persons. In the Hamburg district 4,000 are employed, as compared with 1,300 ten years ago. This shows the rapid growth of these industries in Germany in the last few years, a fact which is attracting the attention of England and other countries as well.

J. L. H.

SCIENTIFIC NOTES AND NEWS.
COLOR-VISION.

MR. T. C. PORTER has given a communication to the Royal Society (presented by Lord Rayleigh and printed in the *Proceedings*, June 30) on the flicker phenomenon. He found, among other things, making use for this purpose of a cardboard disc half black and half white, viewed in the different colors of the spectrum of the second order of a Rowland's plane diffraction grating of 14,434 lines to an inch, that the greater the duration of the stimulation of the retina by the colored light the shorter the time during which it continued to be undiminished in amount, and that, with some exactness, one of these quantities is inversely proportional to the other. This inverse proportionality is known to hold between the brightness of the stimulus and its undiminished duration; it is now seen that when the brightness is constant a longer period of exposure plays the same part as a greater luminosity as regards its undiminished continuance.

IT has been shown by Professor Albertoni that there is a close relation, in the de-

velopment of animals, between the rods and the pigment of the epithelium. In some animals both are formed before birth; in others both are formed after birth; in all, the pigment gets its full intensity only after birth, and in those born blind (kittens) only some days after they open their eyes. It would be interesting to find out if kittens pass through a period during these few days after their eyes are opened, when, although they can see by daylight, they are not yet provided with night-vision. Professor Albertoni does not distinctly say that the rods are destitute of the visual purple at this time, when the pigment of the epithelium is wanting, but it is very probable that that is the case.

C. L. F.

EXPERIMENTS WITH KITES AT BLUE HILL OBSERVATORY.

THE world's record for high kite flight was broken on August 26th at Mr. Rotch's observatory by Messrs. Clayton and Ferguson, who dispatched a tandem of kites into the air until the highest one reached an altitude of 12,124 feet above the sea level, a height 277 feet greater than any kite has reached heretofore.

The top kite was of the Lamson ribbed pattern, and had an area of 71 square feet. The other kites were the modified Hargrave box variety, and had a combined area of 149 square feet. All the kites were fitted with self-regulating, elastic bridles, invented at the observatory, to prevent the kites from exerting a dangerous pull. Five miles of line, weighing 75 pounds, was let out, while the weight of the kites, recording instruments and secondary line, was 37 pounds, making a total of 112 pounds lifted into the air. The recording instrument was made by Mr. Ferguson and was of aluminum, weighing three pounds, and registering temperature, pressure, humidity and wind velocity. The ascent was begun at 11 o'clock, and the highest point reached at 4:15 p. m.

The kites passed through clouds when about a mile above the surface of the earth, but while above the clouds the instruments showed the air to be very dry. At the highest point the temperature was 38 degrees and the wind velocity 32 miles an hour. At the ground at the

same time the temperature was 75 and the wind velocity 32 miles. The highest wind velocity recorded was 40 miles an hour at a height of 11,000 feet. The wind on the ground at this time was from the west, while at the highest point reached by the kites it was southwest. The flight was one of a series of high ascents made during the spring and summer, averaging about a mile and a-half, while on several occasions a height of over 10,000 feet has been obtained.

THE PREVENTION OF CONSUMPTION.

WE learn from the *British Medical Journal* that the Congress of Tuberculosis, which came to an end on August 2d, passed the following resolutions: The Congress, considering that contagion constitutes by far the most important cause of human tuberculosis, and that sputa dried and reduced to dust are the most effective agents of contagion, makes the following recommendation: 1. That, until the time arrives when tuberculosis will be included among the contagious diseases the notification of which is compulsory, all places open to the public should be provided with hygienic spittoons, and with a conspicuous notice forbidding expectoration anywhere else than into these receptacles. 2. That the public authorities set the example by ordering the carrying-out of this measure with the least possible delay in all places under their jurisdiction, and especially in schools of every class; this is the most vital point in the reform. 3. That tuberculous patients should not be sent to convalescent homes open to persons suffering from other diseases. 4. That homes should be established and specially reserved for convalescent children. 5. That a 'medical committee of initiative' for the establishment of popular and gratuitous sanatoria should be formed. 6. That the private initiative of the medical body, and the initiative of the public imitating the example already set in France and in other countries, should lead to the creation of the largest possible number of sanatoria. 7. That the Minister of Public Instruction and the Department of Public Hygiene in the Ministry of the Interior encourage, by an official patronage, the courses of instruction in hygiene which the League against Tuberculosis

is now organizing in Paris in each *arrondissement*, with the idea of extending this movement to the other towns of France. 8. That the Permanent Committee of the Congress make an official application to the general management of the Universal Exhibition of 1900 to bespeak its interest in the work of prevention of tuberculosis by studying, in conjunction with the Committee, the form in which instruction should be given to visitors to the Exhibition as to the means whereby tuberculosis is contracted and can be avoided. 9. That periodical international meetings be held for the study of tuberculosis, especially its prophylaxis. 10. That governments should endeavor to devise means of preventing or repressing the fraudulent use of tuberculin for the purpose of concealing the existence of tuberculosis in animals intended for sale or exportation. The Congress, further, considering that the constant increase of tuberculosis of bovine animals gravely threatens public health and wealth, and that contagion is the sole truly efficient cause of this increase, affirms the urgent necessity of legislative measures enjoining (a) the separation of diseased from healthy animals; (b) the prohibition of the sale of diseased animals for butcher's meat; (c) the supervision of cowhouses devoted to the production of milk intended for public use as food, and the immediate slaughter of every cow affected with tuberculous mammitis; (d) the sterilization or at least the pasteurization of milk intended for the production of butter and cheese on a large scale; (e) the generalization of the service of inspection of butcher meat on a plan more or less analogous to that which has been in operation in Belgium for several years.

GENERAL.

PROFESSOR KOCH is at present engaged in the study of malaria in the hospitals of Milan, and expects to make a special investigation of the subject in Italy.

A DINNER, at which Lord Lister will preside, will be given to Professor Virchow on October 5th, on the occasion of his visit to London to deliver the second Huxley lecture.

THE Americans in attendance at Cambridge at the Congresses of Zoology and Physiology were Professors Bowditch and Porter, of Har-

vard; Professors Osborn and Lee, of Columbia; Professors Marsh and Lusk, of Yale; Professor Mark, of Harvard; Professor Baldwin, of Princeton; Professor Jastrow, of Wisconsin; Professor Lombard, of Michigan; Professor Watase, of Chicago; Professor Atwater, of Wesleyan, and Dr. Stiles, of the United States Department of Agriculture.

PROFESSOR WILLIAM JAMES, of Harvard University, is at present giving lectures on the Pacific Coast. These include an address before the Philosophical Union of the University of California, which, under the direction of Professor Howison, is doing much for the advancement of philosophy in America.

DR. ARNOLD GRAF, the author of valuable contributions to morphology, died in Boston on September 3d, aged thirty years. A notice of his scientific work will follow:

DR. JOHN HOPKINSON, the well-known English electrical engineer, was killed by an Alpine accident, on about August 28th. The cablegram conveying this information states that his son and two daughters were also killed, the party having apparently fallen over a precipice while ascending one of the high Alps without a guide. Dr. Hopkinson, born in 1849, was a graduate of London and Cambridge. He was elected Fellow of the Royal Society in 1878 and was elected President of the Institution of Electrical Engineers in 1890 and again in 1895. He had contributed important scientific papers to the *Transactions* of the Royal Society, but is best known for his inventions in the application of electricity. Dr. Hopkinson was intending to visit America during the coming autumn.

WE regret also to record the following further deaths among men of science abroad: Mr. J. A. R. Newlands, who in 1887 was awarded the Davy Medal of the Royal Society, in recognition of his discoveries regarding the periodic relations between the atomic weights of the elements; M. J. M. Moniz, the naturalist, who died at Madeira on July 11th, and M. Pomel, a mining engineer, who made important contributions to our knowledge of the Sahara.

WE were compelled to record some time since the regrettable fact that M. Grimaux, the eminent French chemist, had been forced to

retire from his chair in the École Polytechnique, owing to his sympathy with the protests against the scandals in the French army and courts. M. Grimaux was elected President of the French Association for the Advancement of Science two years ago, but when he attempted to deliver his address at Nantes he was interrupted by noisy demonstrations, countenanced apparently by the mayor, to such an extent that he was unable to proceed. The address was subsequently delivered in a school-house, from which the public was excluded, and M. Grimaux did not even venture to preside at the closing meeting of the Association.

THE screw schooner *Godthaab* left Copenhagen on August 16th for Angmagsalik, in East Greenland, with an expedition under First Naval Lieutenant Amdrup. The expedition, which has been fitted out by a scientific institute at a cost of 150,000 kroner, is provisioned for two years. Its object is to explore the east coast of Greenland between the 66th and 70th degree north latitude, with Angmagsalik as its starting point.

THE steam whaler *Fridtjof*, having on board Mr. Walter Wellman and the members of the expedition to Greenland, has returned to Norway after landing an expedition at Cape Tegethoff, on the southern part of Hall's Island. While the Wellman party were returning they met the expedition to Franz Josef Land under Dr. A. G. Nothorst at Koenigskar Island, and were informed that all search for Andrée had proved futile.

A NEW photographic telescope for the Cambridge Observatory is now finished at the works of Sir Howard Grubb. As the buildings are also finished, it is expected that the telescope will soon be in use.

A GRANT of £250 was made by the British government from the Royal Bounty Fund toward the expenses of the International Congress of Zoology.

IT appears from a recently-issued Blue Book that the visitors to the Natural History Museum, in London, in 1897, numbered 422,607, as against 453,956 in 1886. The attendance on Sundays was well maintained, nearly 50,000 persons having, in the course of the year, availed

themselves of the privilege afforded them. The average daily attendance for the year was: For all open days (including Sundays), 1,167; for week-days only, 1,203; and for Sundays, when the Museum is open only during part of the day, 956.

IN the course of last year 26,029 volumes and pamphlets (including 124 atlases and 1,355 books of music) were added to the library of the British Museum, of which 5,962 were presented, 12,175 were received in pursuance of the laws of English copyright, 718 by colonial copyright, 480 by international exchange, and 7,594 acquired by purchase.

THE *Southern Cross*, fitted out by Sir George Newnes for Antarctic exploration under Mr. Borchgrevink, has left London for Hobart Town. The expedition, which is well equipped for scientific work, is expected to return in 1900.

THE steamship *Hope* arrived at St. Johns, N. F., on August 27th. It is reported that after leaving Sydney, C. B., the first landing was at Cape York, where Esquimaux could not be found. The expedition then sailed for Snow Pocket Bay, but here, again, they were disappointed. They then proceeded to Saunders Island, finding the natives there in poor condition. The *Hope* took on board a number of Esquimaux and sailed for Whale Sound, but owing to the heavy ice pack was unable to get in. She came out without serious injury. The party then decided to return to Saunders Island and spent a fortnight there. Then the *Hope* proceeded for Foulkefiord, meeting the *Windward* on the way. The latter is said to be a poor ship for this work, being unable to steam to any advantage. At Foulkefiord the *Hope* parted with Lieutenant Peary and sailed south on the 13th ult., the *Windward* leaving at the same time for Sheard Osborne Fiord, where Lieutenant Peary will make his headquarters during the winter.

IT will be remembered that at the time of the celebration of the centenary of the discovery of vaccination in 1896 it was decided to erect some permanent memorial to Jenner in Great Britain. The name of the British Institute of Preventive Medicine has been changed to the Jenner Institute of Preventive Medicine, and it

is proposed to collect £100,000 for the endowment of research in the Institute. The subscriptions include £5,000 from Lord Iveagh; £2,000 from the Earl of Derby; £600 from the Duke of Westminster, who, it will be remembered, assisted the Institute to obtain the site which its new building now occupies on the Chelsea Embankment; £100 from Lord Lister, and £200 from Mr. Alfred de Rothschild. Donations and subscriptions may be sent to the Honorary Treasurer of the Jenner Memorial Fund, Sir Henry E. Roscoe, 10, Bramham Gardens, London, S.W.

Nature states that the proposal made at the Toronto meeting of the British Association last year for a marine biological station in the Dominion of Canada is taking practical shape. Professor Prince, the Dominion Commissioner of Fisheries, reported at length upon the necessity for such a marine station for Canada in the *Marine and Fisheries Blue Book*, 1894; and the Royal Society, of Canada, also urged the importance of the matter; but it was not until the British Association appointed a committee, consisting of Professor E. E. Prince (Ottawa), Chairman; Professor Penhallow (Montreal), Secretary, and Professor A. B. Macallum (Toronto), Professor John Macoun (Ottawa), Professor Wesley Mills (Montreal), Professor E. W. MacBride (Montreal), and Dr. W. T. Thiselton-Dyer, that active steps were taken to carry out the scheme. An influential deputation waited upon the Hon. Sir Louis Davies, Minister of Marine and Fisheries, in April last, and during the recent sessions of the Canadian Parliament a vote of £3,000 was practically sanctioned, £1,400 being granted for the year 1898-99. A Board of Management has been chosen as follows: Professor E. E. Prince (nominated by Sir Louis Davies to represent the Department of Marine and Fisheries), to act as Director; Professors Penhallow and MacBride (McGill University), Ramsey Wright (Toronto University), L. H. Bailey (New Brunswick University), Rev. F. A. Huart (Laval University, Quebec), and members from Queen's University, Kingston, and Dalhousie University, Halifax, Nova Scotia.

IT is officially announced that there were 2,300 deaths from the plague during the last

week of August in the Bombay Presidency. The epidemic is spreading, and there has been a fresh outbreak in the state of Hyderabad.

WE regret to note that the will of the late Adolph Sutro, who bequeathed valuable property in San Francisco for charitable and educational purposes, will be contested.

MESSRS. D. APPLETON & Co.'s announcements for August and September include 'The Earth and Sky,' by Professor Edward S. Holden, and 'Philip's Experiments, or Physical Science at Home,' by Professor John Trowbridge, of Harvard University.

WE have received from the American Entomological Society a reprint, from the twenty-fifth volume of their *Transactions*, of the bibliographical notice of George Henry Horn, by Philip P. Calvert. A portrait of Dr. Horn forms the frontispiece of the pamphlet. There is included a chronological list of his entomological writings, compiled by Mr. Samuel Henshaw, who also contributes an index to the genera and species of Coleoptera described and named in the 265 papers.

WE learn from *Nature* that many Polish men of science have signed a protest against the action of the Prussian authorities at Posen (Poznan) in prohibiting them from attending the meeting of the Polish Association for the Promotion of Medical and Natural Knowledge, which it was proposed to hold in that town at the beginning of August. Early in July the organizing committee of the meeting was informed by the Director of Police that persons of Polish nationality would not be permitted to take part in the proceedings, and that if they went to Posen they would be expelled from the country immediately. For thirty years the Association has held its meetings without any difficulties, and in the year 1884 a meeting was held in the town of Posen itself. The recent action, directed as it was against men whose only object was calm and friendly intercourse, violates the legitimate claims of science and discourages scientific investigation in Poland. It is unfortunate that intellectual enterprise should be made to suffer on account of strained relations between certain members of German and Polish nationali-

ties. The protest against the measures taken by the Prussian police authorities has been signed by most men of science in Cracow and Lemberg, and forwarded to the Polish members of the Austrian Parliament.

Nature states that efforts are being made to secure for the Maidstone Museum and Public Library the collection of prehistoric flint implements formed during the past thirty-four years by Mr. Benjamin Harrison, and illustrating important periods in the early history of man in Great Britain and elsewhere. It is proposed to select, from the specimens in Mr. Harrison's collection, the type series chosen from the chalk plateau implements by Sir Joseph Prestwich to illustrate his monographs upon the subject of plateau or eolithic implements, and other type implements which have been figured and described by other writers; a series to show variety of form and the probable uses to which these implements have been put; a collection of paleolithic implements from gravels in the West Kent district; and type series of neolithic implements found in Kent. The Maidstone Museum is situated in the immediate vicinity of the district in which they were discovered. An appeal for subscriptions to purchase the collection, signed by the Mayor of Maidstone, has been issued by the Museum Committee and nearly £100 have been subscribed.

THE *British Medical Journal* states that during the first few years after the foundation of the Anticharbon Institute at Turin the number of tubes of anticharbon vaccine sent out was only 4,000 to 5,000 a year. Professor Pagliani, then Director of the Public Health, decided that the Laboratory, which had been founded at Turin by Perroncito, should be removed to Rome. Immediately after this the production of vaccine greatly increased, as it was found possible to reduce its price. In the disorganization which overtook the Department of Public Health two years ago this laboratory came to grief; fortunately, however, its work was taken up by the Sero-therapeutic Institute of Milan, from which the vaccine continues to be sent out under the supervision of Professor Airoldi, a former assistant of Perroncito. Now the

yearly output of anticharbon vaccine amounts to 165,000 tubes. From May 1, 1897, to April 30, 1898, sufficient vaccine was sent out to inoculate 33,734 bovine and 98,792 ovine animals. Anthrax has greatly diminished in Italy in recent years; but, in spite of the large amount of anticharbon serum supplied, a good many cases still occur, both among animals and among men, in different parts of the country.

THE Committee appointed by the Board of Trade, a year ago, to consider and advise upon the means of obtaining and publishing information as to opportunities for the introduction and development of British home trades in the various districts in which we have official representatives have adopted their reports. According to *Nature* it is suggested that the most economical course would be to send out experts periodically to make inquiries and to report upon the progress and the direction of trade. The Committee recommend the establishment of an office whose function it shall be to meet the constantly-increasing demand for prompt and accurate information on commercial matters, so far as it can be met by government action. Amongst the duties of this new office would be: (1) To collect and focus existing information upon any subjects of commercial interest, whether derived from official or from unofficial sources, and whether relating to British colonies or dependencies or to foreign countries. (2) To reply to inquiries which can be answered by a short note or by word of mouth, or by reference to published commercial data and statistics. (3) To direct inquirers who want special information to the proper quarter, *e. g.*, to the Commercial Department of the Foreign Office, the office of a particular colony, Chamber of Commerce, the Imperial Institute, and so forth. The proposed office would also bring together all the information contained in the diplomatic and consular reports bearing upon particular industries and the state of the market for particular classes of goods.

UNIVERSITY AND EDUCATIONAL NEWS.

DR. WILLIAM P. GRAHAM has been appointed associate professor of electrical engineering in Syracuse University.